Maricopa County Environmental Services Department
Air Quality Division
Operation and Maintenance (O&M) Plan
Guidelines

This document provides guidance in the preparation of O&M Plans required as part of an Air Quality Permit and/or Maricopa County Air Pollution Control Regulations. The goal is to establish acceptable operating parameters and limits, maintenance procedures and schedules, and documentation methods that will demonstrate the control device is being properly operated and maintained. Multiple control devices can be combined in a single O&M Plan providing they are identical in type, capacity, and use. Each device that is unique in type, capacity, or use must be contained in a separate plan.

I) GENERAL INFORMATION

This information provides identification and a quick understanding of the facility and equipment and the basis for the O&M Plan.

II) OPERATION PLAN

Key operating parameters are quantifiable parameters (pressure drops, temperatures, flow rates, etc.) that, once properly defined, are considered indicators that a control device is functioning as designed. Operations log sheets should, at a minimum, contain the following information: date and time of readings; identification of the individual recording the data; operating parameters to be monitored including units of measure, allowable operating range (upper and/or lower limits, if applicable), and space for recording measurements; measurement frequency; and space for additional information such as corrective action taken or general comments. A log sheet must be completed for every day the process and control device are in operation. All values are to be recorded including those out of range at the time readings are taken. Sample operations log sheets are available from the Division for common types of control devices and it would be preferred that these forms be used, if possible. A copy of the actual log sheet(s) to be used at the facility are to be included in the O&M Plan.

If an automatic data recording system will be used, provide information on its measurement frequency and how the information will be recorded in addition to the above requirements. If recording charts are used, provide space on the charts to document the date, time, and initials of the individual checking system performance.

If changing the location of the measurement device would affect its reading (for example, the location of the thermocouple on an afterburner), then the location of the device must be documented either in the text of the O&M plan or through a scaled drawing.

III) MAINTENANCE PLAN

Maintenance procedures (inspections, cleanings, lubrications, adjustments, replacements, instrumentation calibrations, etc.) are performed on a routine basis to ensure the equipment remains in peak operating condition. Maintenance checklists should, at a minimum, contain the following information: date; identification of the individual performing the maintenance check; procedures to be performed including frequency of occurrence; results of inspection (acceptable, nozzle plugged, belt cracked, etc.); corrective action taken (none, cleaned nozzle, replaced belt, etc.); and space for additional information such as observations or general comments. Sample maintenance checklists, containing general preventative maintenance that should be considered, are available from the Division for common types of control devices and it would be preferred that these forms be used, if possible. A copy of the actual checklist(s) to be used at the facility are to be included in the O&M Plan.

IV) OTHER INFORMATION

Additional information, such as process diagrams, control device schematics, etc. may be included only if it would be helpful in understanding the O&M Plan. Please do not provide a copy of the O&M Plan supplied by the equipment manufacturer.

All O&M Plan forms are available electronically by accessing www.maricopa.gov/sbeap/

Changes to an existing O&M Plan should be made by submitting a complete, revised O&M Plan with a cover letter identifying all changes and the reason for such changes.

This document is meant to serve as a general guideline in the preparation of O&M Plans. Since unique circumstances may exist, the Division reserves the right to request additional information to ensure compliance with air quality regulations.

MARICOPA COUNTY ENVIRONMENTAL SERVICES DEPARTMENT
AIR QUALITY DIVISION
OPERATION AND MAINTENANCE (O&M) PLAN

I) GENERAL INFORMATION

Business Name: _____

Business Address: _____

_____

_____

Permit Number: _____

Date Of Preparation/Revision: _____

General description of overall facility operations: _____

_____

_____

_____

_____

_____

_____

Brief description of process(es) ducted to control device including pollutants emitted:

_____

_____

_____

_____

_____

_____

Complete description of control device(s) covered by the plan including manufacturer, model, rated capacity, total number of identical units, equipment identification number, etc.: _____

_____

_____

_____

_____

_____

_____

Business Name:_____
Equipment Identification:_____
O&M Plan Revision Date:_____

II) OPERATION PLAN

List the operating parameters to be monitored including the units of measure (inches H_2O, deg F, gpm, etc.), acceptable operating range (upper and/or lower limits), and frequency of recording measurements (daily, continuous, etc.)

PARAMETER	UNITS	LIMITS	FREQUENCY

List the method of recording measurements (manual, stripchart recorder, data acquisition system, etc.) and type of instrumentation (magnehelic, temperature sensor, flowmeter, etc.) with display range for each operating parameter:

PARAMETER	METHOD	INSTRUMENT	RANGE

Attach a copy of all operations log sheets, stripcharts, computer printouts, etc. utilized to document operating parameters of the control device.

Notes:
- Instrumentation accuracy is expected to be comparable to industry standard for the specific type of instrumentation.
- Acceptable operating ranges may require modifications to reflect actual conditions during compliance testing.
- A log sheet must be completed for every day the process and control device are in operation.
- Records are required to be maintained for a minimum of five years.

Business Name:_____
Equipment Identification:_____
O&M Plan Revision Date:_____

III) MAINTENANCE PLAN

Maintenance procedures to be performed with the frequency of each procedure:

PROCEDURE	FREQUENCY

Attach a copy of all maintenance checklists, computer printouts, etc. utilized to document completion of maintenance procedures performed on the control device.

Notes: The spare parts inventory should be sufficient to handle all maintenance requirements and reasonably expected malfunction corrections.
Records are required to be maintained for a minimum of five years.

Sample Operations Log Sheets
& Preventative Maintenance Checklists

Attached are sample operations log sheets and preventative maintenance checklists for a variety of control devices and it would be preferred that these forms be used, if possible. Depending on the particular equipment and its application at your facility, some operating parameters and maintenance procedures may not be applicable or additional items may be necessary. If your specific control device is not one of the those addressed in the attached forms, follow the O&M Plan Guidelines or contact the Division for assistance.

OPERATIONS LOG INSTRUCTIONS

The operating parameters contained in the attached operations log sheets are representative of desirable operating parameters available for that equipment. Although it is highly recommended that as many of these parameters as possible be monitored and recorded, the minimum acceptable operating parameters for each control device are shown below:

Wet Scrubber: Scrubber pressure drop, recirculation rate, makeup water flowrate or blowdown rate, pH, and visible emissions.

Thermal Oxidizer: Inlet gas flow rate, combustion gas temperature, and visible emissions.

Catalytic Oxidizer: Inlet gas flow rate, pre-catalyst temperature, post-catalyst temperature, catalyst pressure drop, and visible emissions.

Carbon Adsorption System: Adsorption temperature, desorption temperature, and effluent concentration.

Baghouse: Inlet temperature, baghouse pressure drop, and visible emissions.

Cyclone: Cyclone pressure drop and visible emissions.

It may be useful for facilities with multiple control devices to record data on a single log sheet.

MAINTENANCE CHECKLIST INSTRUCTIONS

The maintenance procedures and performance frequencies contained in the attached checklists are general procedures that should be considered for your equipment. Consult the equipment manufacturer for specific procedures and performance frequencies appropriate for your equipment.

It may be useful to create separate forms for each maintenance period (i.e. weekly, quarterly, etc.) or record multiple sets of weekly procedures, for instance, on one checklist.

Business Name:_____
Equipment Identification:_____
O&M Plan Revision Date:_____

WET SCRUBBER SYSTEM
DAILY OPERATIONS LOG SHEET

PARAMETER	LIMITS	READINGS						
Scrubber pressure drop (in H_2O)								
Recirculation rate (gpm)								
Makeup water flowrate (gpm)								
Blowdown rate (gpm)								
pH								
Conductivity								
Supply water pressure (psig)								
Visible emissions (excluding water vapor)								
Date								
Time								
Technician								

COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN): _____

Business Name:_____
Equipment Identification:_____
O&M Plan Revision Date:_____

WET SCRUBBER SYSTEM
PREVENTATIVE MAINTENANCE CHECKLIST

DATE: _____ **TECHNICIAN:** _____

WEEKLY PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Check pump & fan motor for unusual vibration, noise, or heat		
Inspect system for leaks		
Check system dampers for proper operation		
Check chemical metering pumps & probes for proper operation		

MONTHLY PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Inspect spray nozzle distribution pattern		
Inspect/clean flow strainer		
Check fan housing drain		
Check condition of fan bearings, belts, & seals		
Inspect fan impeller & blades for solids buildup or erosion		

QUARTERLY PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Inspect packing for breakage & settling		
Check piping for erosion or plugging		

SEMI-ANNUAL PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Calibrate instrumentation		
Inspect sump, packing, & ductwork for solids buildup		
Inspect tower internals for corrosion or breakage		
Inspect ductwork, fan, & structural supports for deterioration/damage		

COMMENTS: _____

Business Name:_____
Equipment Identification:_____
O&M Plan Revision Date:_____

THERMAL OXIDIZER
DAILY OPERATIONS LOG SHEET

PARAMETER	LIMITS	READINGS						
Inlet gas flow rate (cfm)								
Inlet temperature (°F)								
Combustion gas temperature (°F)								
Stack temperature (°F)								
Fuel flow rate (cfm)								
Visible emissions present at outlet								
Date								
Time								
Technician								

COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN): _____

Business Name:_____
Equipment Identification:_____
O&M Plan Revision Date:_____

THERMAL OXIDIZER
PREVENTATIVE MAINTENANCE CHECKLIST

DATE: _____ **TECHNICIAN:** _____

WEEKLY PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Inspect fuel piping train for leaks		

MONTHLY PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Check condition of fan bearings & belts		
Inspect refractory for cracks		
Inspect/clean burner area		

QUARTERLY PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Inspect system/ductwork for leaks		
Lubricate fan motor bearings		
Inspect burner for warpage & corrosion		
Inspect burner gas jets for corrosion & deposits		
Inspect electrical valves & interlock switches for dirty contacts, moisture leaks, & deteriorating insulation		
Verify interlocks are working		

SEMI-ANNUAL PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Inspect outer shell for weld cracks & hot spots		
Calibrate instrumentation		
Inspect ductwork for dirt & blockages		

COMMENTS: _____

Business Name:_____
Equipment Identification:_____
O&M Plan Revision Date:_____

CATALYTIC OXIDIZER
DAILY OPERATIONS LOG SHEET

PARAMETER	LIMITS	READINGS						
Inlet gas flow rate (cfm)								
Pre-catalyst temperature (°F)								
Post-catalyst temperature (°F)								
Fuel flow rate (cfm)								
Catalyst pressure drop (in H_2O)								
Visible emissions present at outlet								
Date								
Time								
Technician								

COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN): _____

Business Name:_____
Equipment Identification:_____
O&M Plan Revision Date:_____

CATALYTIC OXIDIZER
PREVENTATIVE MAINTENANCE CHECKLIST

DATE: _____ **TECHNICIAN:** _____

WEEKLY PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Inspect auxiliary fuel piping train for leaks		

MONTHLY PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Check condition of fan bearings & belts		
Inspect refractory for cracks		
Inspect/clean burner area		

QUARTERLY PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Inspect system/ductwork for leaks		
Lubricate fan motor bearings		
Inspect burner for warpage & corrosion		
Inspect burner gas jets for corrosion & deposits		
Inspect electrical valves & interlock switches for dirty contacts, moisture leaks, & deteriorating insulation		
Verify interlocks are working		

SEMI-ANNUAL PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Inspect outer shell for weld cracks & hot spots		
Calibrate instrumentation		
Test catalyst for activity		
Inspect ductwork for dirt & blockages		

COMMENTS: _____

Business Name:_____
Equipment Identification:_____
O&M Plan Revision Date:_____

CARBON ADSORPTION SYSTEM
DAILY OPERATIONS LOG SHEET

PARAMETER	LIMITS	READINGS						
Adsorption temperature (°F)								
Desorption temperature (°F)								
Influent concentration (ppm)								
Effluent concentration (ppm)								
Air filter pressure drop (in H_2O)								
Steam pressure (psi)								
Date								
Time								
Technician								

COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN): _____

Business Name:_____
Equipment Identification:_____
O&M Plan Revision Date:_____

CARBON ADSORPTION SYSTEM
PREVENTATIVE MAINTENANCE CHECKLIST

DATE: _____ **TECHNICIAN:** _____

WEEKLY PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Inspect physical condition of solvent meters		
Inspect/replace prefilter		

MONTHLY PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Check for unobstructed airflow in ductwork		
Check gaskets, dampers, & seals for leaks		
Check system for signs of corrosion		
Check vent & drain lines for plugging		
Check for leaks in air ducts, connections, fan & filter housings, & around dampers		

SEMI-ANNUAL PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Check for unobstructed airflow in ductwork		
Lubricate bearings, compressed air components, & air cylinder shafts		
Check system balance		
Check condenser for solids buildup		
Calibrate instrumentation		
Inspect carbon bed depth		
Sample carbon for adsorbability & retentivity		
Sample wastewater discharge & recovered solvent		

COMMENTS: _____

Business Name:_____
Equipment Identification:_____
O&M Plan Revision Date:_____

BAGHOUSE
DAILY OPERATIONS LOG SHEET

PARAMETER	LIMITS	READINGS						
Inlet temperature (°F)								
Outlet temperature (°F)								
Baghouse pressure drop (in H_2O)								
Compressed air pressure (psi)								
Visible emissions present at outlet								
Date								
Time								
Technician								

COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN): _____

Business Name:_____
Equipment Identification:_____
O&M Plan Revision Date:_____

BAGHOUSE
PREVENTATIVE MAINTENANCE CHECKLIST

DATE: _____ **TECHNICIAN:** _____

DAILY PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Monitor cleaning system cycle		

WEEKLY PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Check for proper system damper operation		
Check bag tension		
Check compressed air system		
Activate key shutdown or bypass controls		

MONTHLY PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Spot-check bag condition & seating		
Inspect system for corrosion & material buildup		
Check all moving parts for vibration, wear, & alignment		

QUARTERLY PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Thoroughly inspect bags		
Inspect door gaskets		
Check for dust buildup in ducts		
Check proper damper valve seating		

SEMI-ANNUAL PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Calibrate instrumentation		
Check cleaning system for rebalance requirement		
Inspect baffles, hopper duct, etc. for wear		
Inspect general structural integrity of system		

COMMENTS: _____

Business Name:_____
Equipment Identification:_____
O&M Plan Revision Date:_____

CYCLONE
DAILY OPERATIONS LOG SHEET

PARAMETER	LIMITS	READINGS						
Inlet temperature (°F)								
Cyclone pressure drop (in H_2O)								
Gas velocity (ft/sec)								
Visible emissions present at outlet								
Date								
Time								
Technician								

COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN): _____

CYCLONE
PREVENTATIVE MAINTENANCE CHECKLIST

DATE: _____ **TECHNICIAN:** _____

MONTHLY PROCEDURES:	**RESULTS**	**ACTION TAKEN**
Inspect cyclone & ductwork for plugging		
Check for proper damper settings		
Check condition of cyclone walls & fan blades		
Inspect dust discharge mechanisms for leakage from dust discharge		

COMMENTS: _____